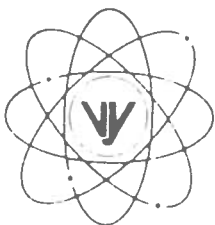


# VERMONT YANKEE NUCLEAR POWER CORPORATION



P.O. Box 157, Governor Hunt Road  
Vernon, Vermont 05354-0157  
(802) 257-7711

May 23, 1997  
BVY 97-70

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555

Reference: (a) License No. DPR-28 (Docket No. 50-271)

Subject: Reportable Occurrence No. LER 97-008, Rev. 0

As defined by 10CFR50.73, we are reporting the attached Reportable Occurrence as LER 97-008, Rev. 0.

Sincerely,

Vermont Yankee Nuclear Power Corporation

Gregory A. Maret  
Plant Manager

cc: USNRC Region I Administrator  
USNRC Resident Inspector - VYNPS  
USNRC Project Manager - VYNPS

9705290004 970523  
PDR ADOCK 05000271  
S PDR

IE22/1



**LICENSEE EVENT REPORT QUALITY ASSURANCE CHECK SHEET**

**LER NUMBER:** 27197008

**BATCH:** 1090

**STUDY:** ES

**PAGES:** 5

**TITLE:** PLANT SCRAM DUE TO PROCEDURAL NON-COMPLIANCE AND FAILURE TO  
PERFORM SELF-VERIFICATION DURING NUCLEAR INSTRUMENTATION  
CALIBRATION

**EVENT DATE:** 04/24/97

**LER REVISION:** 00

**OTHER FACILITIES:**

**OPERATING MODE:** n

**APPLICABLE CFR:** M

**POWER LEVEL:** 100

**AUTHOR:**

MARET, GREGORY A.

**CAUSE**

**SYSTEM**

**NPRDS REPORTABILITY**

**COMPONENT**

**MANUFACTURER**

**NPRDS**

**CONTINUED:**

**SUPPLEMENT:** N

**SUPPLEMENT DATE:**

**QA BY:**

**QA DATE:**

6/5/97

1090

NRC Form 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION  <b>LICENSEE EVENT REPORT (LER)</b>				APPROVED BY OMB NO. 3150-0104 EXPIRES 04/30/98 ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.					
FACILITY NAME (1) VERMONT YANKEE NUCLEAR POWER STATION				DOCKET NUMBER (2) 05000271		PAGE (3) 01 OF 05			
TITLE (4) Plant scram due to procedural non-compliance and failure to perform self-verification during nuclear instrumentation calibration.									
EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)		OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME
04	24	97	97	-- 008 --	00	05	23	97	N/A
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: CHECK ONE OR MORE (11)							
N		20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)	
POWER LEVEL (10) 100		20.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)	
		20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71	
		20.2203(a)(2)(ii)		20.2203(a)(4)		X 50.73(a)(2)(iv)		OTHER	
		20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		(Specify in Abstract below or in NRC Form 366A)	
		20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)			
LICENSEE CONTACT FOR THIS LER (12)									
NAME <i>Kevin A. Burton For CAM</i> GREGORY A. MARET, PLANT MANAGER						TELEPHONE NO. (Include Area Code) 802-257-7711			
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)									
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	.....	CAUSE	SYSTEM	COMPONENT	MANUFACTURER
NA				NO	.....	NA			
NA					.....	NA			
SUPPLEMENTAL REPORT EXPECTED (14)						EXPECTED SUBMISSION DATE (15)		MO	DAY
YES (If yes, complete EXPECTED SUBMISSION DATE)				X	NO				

**ABSTRACT** (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On 04/24/97 an Automatic Reactor Scram occurred as a result of personnel errors made during calibration of the Local Power Range Monitor (LPRM) detectors. Average Power Range Monitor (APRM) channels "A" and "D" were removed from service to block test signals to the Reactor Protection System (RPS). Failure to properly perform a procedural step resulted in the mode selector switches for APRM channels "A" and "D" remaining in the "Zero" vice "Operate" position. Following the calibration of the LPRM detectors, the procedure directed that the affected APRM output be adjusted to indicate core thermal power. Having omitted the restoration of the APRM mode switches the Reactor Engineer (RE) was unable to adjust APRM output. Without resolving this discrepancy, the RE proceeded with the testing activity. The RE then requested the Licensed Operator to restore APRM channels "A" and "D" to service. The rapidity with which the Licensed Operator restored both APRM channels to service did not allow for proper verification of system response. A reactor scram occurred and went to completion. The Operators followed plant procedures for a reactor scram and the plant was stabilized. A post trip report and cause analysis were conducted. Lessons learned were presented to all Licensed Operators. The need for procedural compliance and communication of problems as they occur were reinforced to Site personnel. The quality and ownership of affected procedures are being reviewed and improvements are being made as necessary. This event is not considered to have presented an increased threat to public health or safety.

NRC Form 366 (4-95)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED BY OMB NO. 3150-0104 EXPIRES 04/30/98 ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.		
LICENSEE EVENT REPORT (LER)						
FACILITY NAME (1)		DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
VERMONT YANKEE NUCLEAR POWER CORPORATION		05000271	YEAR 97	SEQUENTIAL NUMBER -- 008 --	REV # 00	02 OF 05

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

#### DESCRIPTION OF EVENT

On 04/24/97, with the reactor operating at 100% power, an automatic reactor scram occurred as a result of personnel errors made during calibration of Local Power Range Monitor (LPRM) detectors. The reactor scram initiated when Average Power Range Monitoring (APRM) channels "A" and "D" (EIS=IG) were restored into the Reactor Protection System (RPS) (EIS=JC) while they were in a test configuration.

On 4/24/97 at 0825 the Shift Supervisor authorized Reactor Engineering, with assistance from Instrumentation and Control (I&C), and Operations personnel to perform LPRM Calibration and Functional Checks. The Reactor Engineer (RE) maintained custody of the procedure and read to the other technicians their required actions. At 0830 the Licensed Operator bypassed (removed from service) APRM "A" and "D" channels by placing their respective joy sticks to the appropriate positions. APRM channels "A" and "D" share LPRM detectors and provide input to separate RPS channels. They are removed from service during LPRM calibration to block their test signals to RPS during the calibration process.

The initial portion of the surveillance, obtaining data from the process computer and bypassing the APRM channels at the operators station, was completed satisfactorily. The RE then proceeded to a panel behind the operators station to continue the procedure with the assistance of the I&C Technician. The next procedural step contained four action items written in paragraph form and was only partially completed. The RE directed the I&C Technician to place the two APRM Mode Switches for APRM channels "A" and "D" in the Zero position (action 1). The RE verified each APRM meter read zero (action 2). After initialing the data sheet (action 3), the RE neglected to read "Request I&C return the Mode Switch for each channel to operate" (action 4) to the I&C Technician. The APRM channels "A" and "D" Mode Switches were left in the "Zero" position, leaving these channels inoperative.

Between 0840 to 0905 all the LPRM detectors gain adjustments and Hi/Lo trip checks were completed satisfactorily. The next procedural step requires verification that the APRM indicating power matches core thermal power. If the APRM power is not within specification it is adjusted before continuing. The step states "adjust the APRM's prior to removing them from bypass" and requires a sign-off in the data sheets when complete. The RE was not able to verify the APRM channels "A" and "D" readings because they indicated zero power. He read the succeeding step, which returned the APRM channels to service, and concluded (incorrectly) that the APRM bypass switches had to be removed from bypass for the meters to indicate power. The APRM meters actually read zero due to the earlier failure to return the APRM Mode Switches to operate. The RE did not discuss the inability to perform the step with the I&C Technician, Operations personnel or his Supervisor and went on to the next step.

The RE left the I&C Technician, went to the operators station and requested the Licensed Operator to remove APRM channels "A" and "D" from bypass. The Licensed Operator evaluated his indications but did not note that APRM channels "A" and "D" trend recorders read zero vice actual reactor power. The Licensed Operator restored APRM channel "A" to service, noted that its bypass light extinguished and quickly (1.2 seconds later) restored APRM channel "D" to service.

When APRM channel "A" was restored to service, a half scram initiated on RPS trip channel "A". The rapidity with which the Licensed Operator restored APRM channel "D" did not allow for him to be alerted to the half scram alarm lights/horn. When APRM channel "D" was restored to service a half scram initiated on RPS trip channel "B". Both RPS channels now had scram signals, and the Reactor Scram was initiated.

At 0910 an automatic Reactor Scram occurred on signals received from the neutron monitoring system. The operators entered the scram procedure. All control rods inserted completely. Electrical loads successfully transferred to off site power.

An expected low water level transient occurred 5 seconds into the scram from rated power. Actuation of Primary Containment Isolation Systems (EIS=JM) Group 2 (traversing in-core probe isolation), Group 3 (containment atmosphere control isolation)

NRC Form 366 U.S. NUCLEAR REGULATORY COMMISSION (4-95)		APPROVED BY OMB NO. 3150-0104 EXPIRES 04/30/98 ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.			
LICENSEE EVENT REPORT (LER)					
FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REV #	
VERMONT YANKEE NUCLEAR POWER CORPORATION	05000271	97	-- 008 --	00	03 OF 05

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

and Group 5 (reactor water cleanup system isolation) occurred 10 seconds into the scram due to low water level, and went to completion. The transient reactor low water level condition cleared 36 seconds into the scram.

Excessive water level perturbations followed due to the combined affects of a locked feed regulating valve controller (EIS=JB), and an oscillating condensate pump minimum flow valve (EIS=SD, FCV). A high water level alarm was received during these level perturbations. Reactor feed pumps (EIS=SJ, P) tripped due to the high water inventory and low suction pressure. At no time did vessel inventory drop to a value which required initiation of any emergency injection systems.

The operating staff assessed the anomalies, took manual control of the condensate pump minimum flow valve and the feed regulating valves, and stabilized reactor water level.

Coincident with the level perturbations, the plant experienced a turbine trip caused by a high moisture separator level. The moisture separator level control system (EIS=MSR, LT) had been scheduled for observation during the next scheduled shutdown to determine the cause for previous control system irregularities.

#### CAUSES OF EVENT

Root Causes: The root causes of this event were personnel errors in work practices and verbal communications:

##### 1. Work Practices:

###### a. Failure to follow procedure:

- 1) The RE failed to direct the I&C Technician to perform the fourth action contained in a step.
- 2) The RE when unable to perform the verification/adjustment to the APRM channels, moved on to the next step. This was contrary to a statement in the step itself and VY procedural use and adherence requirements.

###### b. Inadequate application of STAR (Stop, Think, Act, Review) techniques: The operator did not verify the correct system response, between each RPS joy stick manipulation.

##### 2. Verbal Communications: The RE failed to stop the calibration and communicate the questions/uncertainties he encountered when unable to perform the verification/adjustment to the APRM channels step.

Contributing Causes: The contributing causes of this event were inadequate procedure and cognitive human error in skill/knowledge.

1. Inadequate Procedure: One step was not written in a manner such that all actions were clearly visible and easily performed. A missed action was one action in a four action step.
2. Skill/Knowledge: A lack of knowledge on system/switch functions was evident by the RE decision to restore the APRM channels to service in order to get a power meter reading.

#### ANALYSIS OF EVENT

The level perturbation, and ensuing trip and isolation functions presented no increased threat to the nuclear process.

NRC Form 366 U.S. NUCLEAR REGULATORY COMMISSION (4-95)		APPROVED BY OMB NO. 3150-0104 EXPIRES 04/30/98 ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.				
LICENSEE EVENT REPORT (LER)						
FACILITY NAME (1)		DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
VERMONT YANKEE NUCLEAR POWER CORPORATION		05000271	YEAR	SEQUENTIAL NUMBER	REV #	
			97	-- 008 --	00	04 OF 05

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

The vessel coolant inventory was never reduced to the level requiring actuation of any emergency injection source. Containment isolations which occurred did not challenge the operators' abilities to achieve a stable shutdown condition.

There are six APRM channels, three for each RPS trip system, to allow one bypass and one undetected failure in each trip system and still satisfy the RPS safety design basis. Interlocks in the systems prevent more than one channel at a time from being bypassed on an RPS channel, and provide a trip signal to RPS any time an APRM is not in the operate position and not bypassed. This ensures the RPS channel is tripped. This "Fail Safe" design prevents the possibility of only one APRM channel providing signals to a RPS channel with the reactor at power. The RPS system operated as designed inputting a trip signal to the RPS channel when an inoperable APRM associated with that channel is restored to service. An automatic scram occurred as designed.

#### SAFETY SIGNIFICANCE

Two operating APRM channels were in service at all times on each RPS channel, thus meeting the RPS safety design basis. No significant unexpected events occurred during the scram recovery to a stable shutdown condition. This event is not considered to have presented an increased threat to public health or safety.

#### CORRECTIVE ACTIONS

Immediate/Interim: These actions are all complete.

1. The Operators placed the plant in a stable state using plant operating procedures.
2. A post trip investigation was conducted by Operations Department.
3. A review/revision of the LPRM Calibration and Functional Check procedure was conducted.
4. Lessons learned were presented to all Licensed Operators.
5. An independent Root Cause investigation was conducted on the event.
6. The need for procedural compliance was reinforced to Reactor Engineering Department.
7. A staff meeting was held to discuss human performance aspects of this event. A subsequent meeting was held for all plant personnel to reinforce management's expectations for procedural adherence and prompt communication of problems when they arise.

Long Term:

1. VY will review all RE procedures that have the ability, if performed incorrectly, to cause a half or full scram. VY will make such procedures "Continuous Use" procedures. VY will verify that such procedures conform to the requirements of the VY Procedures Writer's Guideline. Expected completion October 31, 1997.
2. VY will evaluate turning LPRM Calibration and Functional Check and other similar RE procedures over to the I&C Department. RE would then provide assistance to I&C, as needed. Expected completion October 31, 1997.
3. VY will provide training to RE personnel in the areas of Neutron Monitoring and Reactor Protection Systems. Expected completion September 30, 1997.

NRC Form 366 U.S. NUCLEAR REGULATORY COMMISSION (4-95)		APPROVED BY OMB NO. 3150-0104 EXPIRES 04/30/98 ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.			
LICENSEE EVENT REPORT (LER)					
FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
VERMONT YANKEE NUCLEAR POWER CORPORATION	05000271	YEAR	SEQUENTIAL NUMBER	REV #	05 OF 05
		97	-- 008 --	00	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

ADDITIONAL INFORMATION

A review of the last five years LER's did not reveal any human performance issues which caused an Engineered Safety Feature actuation.